

**Are you Ready
Honors Algebra 3**

Name: **Key**

Evaluate

1. $-3x^2 + (3y)^4$ when $x = -5$ and $y = 1$

$$-3(-5)^2 + (3 \cdot 1)^4$$

2. $\frac{(2x-2)^3}{-y^3-3}$ when $x = 2$ and $y = -2$

$$\frac{[2(2)-2]^3}{-(-2)^3-3}$$

$$-(-2)^3-3$$

Solve

3. $x+4=2x-8\left(\frac{1}{4}x-\frac{1}{4}\right)$

$$x+4=2x-2x+2$$

$$x+4=2$$

$$\boxed{x=-2}$$

4. $x+\frac{3}{5}=\frac{7}{5}(x+1)$

$$\left[x+\frac{3}{5}=\frac{7}{5}x+\frac{7}{5}\right]5$$

$$5x+3=7x+7$$

$$-4=2x$$

$$\boxed{-2=x}$$

Solve for the indicated variable.

5. $C=\frac{5}{9}(F-32)$ **F**

$$\frac{9}{5}C=F-32$$

$$\boxed{F=\frac{9}{5}C+32}$$

6. $P=2b+2s$ **b**

$$P-2s=2b$$

$$\boxed{b=\frac{P-2s}{2}}$$

Solve

7. $|9x-2|=7$

$$9x-2=7$$

$$9x-2=-7$$

$$9x=9$$

$$9x=-5$$

$$\boxed{x=1}$$

$$\boxed{x=-\frac{5}{9}}$$

9. $4+\left|1-\frac{1}{5}x\right|=7$

$$\left|1-\frac{1}{5}x\right|=3$$

$$1-\frac{1}{5}x=3$$

$$1-\frac{1}{5}x=-3$$

$$-\frac{1}{5}x=2$$

$$-\frac{1}{5}x=-4$$

$$\boxed{x=-10}$$

$$\boxed{x=20}$$

8. $2|5-6x|=14$

$$|5-6x|=7$$

$$5-6x=7$$

$$5-6x=-7$$

$$-6x=2$$

$$-6x=-12$$

$$\boxed{x=-\frac{1}{3}}$$

$$\boxed{x=2}$$

10. $\frac{1}{2}|2x+6|-3=3$

$$\frac{1}{2}|2x+6|=6$$

$$|2x+6|=12$$

$$2x+6=12$$

$$2x+6=-12$$

$$2x=6$$

$$2x=-18$$

$$\boxed{x=3}$$

$$\boxed{x=-9}$$

Key

11. $|x-3| < 8$

$x-3 < 8$ $x-3 > -8$

$x < 11$ $x > -5$

$-5 < x < 11$

12. $2|4-x| \leq 16$

$|4-x| \leq 8$

$4-x \leq 8$

$4-x \geq -8$

$-x \leq 4$

$-x \geq -12$

$x \geq -4$

$x \leq 12$

$-4 \leq x \leq 12$

13. $|4 - \frac{1}{2}x| - 2 \leq 4$

$|4 - \frac{1}{2}x| \leq 6$

$4 - \frac{1}{2}x \leq 6$ $4 - \frac{1}{2}x \geq -6$

$-\frac{1}{2}x \leq 2$ $-\frac{1}{2}x \geq -10$

$x \geq -4$

$x \leq 20$

$-4 \leq x \leq 20$

14. $-2|\frac{1}{3}x+4| < -2$

$|\frac{1}{3}x+4| > 1$

$\frac{1}{3}x+4 > 1$

$\frac{1}{3}x+4 < -1$

$\frac{1}{3}x > -3$

$\frac{1}{3}x < -5$

$x > -9$ or $x < -15$

Is the ordered pair a solution of the system?

$(2, 1, 3)$

15. $2x - y + 5z = 16$

$x - 3y + 2z = 5$

$x + 2y + z = 7$

$2(2) - (1) + 5(3) \neq 16$

no
not a
solution

Solve the system

16. $2x - 3y = 3$

$-2x + y = -4$

$-2y = -1$

$y = \frac{1}{2}$

$(\frac{9}{4}, \frac{1}{2})$

$2x - 3(\frac{1}{2}) = 3$ $2x = \frac{9}{2}$

$2x - \frac{3}{2} = \frac{6}{2}$ $x = \frac{9}{4}$

17. $(7x - 3y = 6) \div 5$
 $(-2x + 5y = -10) \div 3$

$35x - 15y = 30$

$-6x + 15y = -30$

$29x = 0$

$x = 0$

$7(0) - 3y = 6$

$y = -2$

$(0, -2)$

18. $4x + 6y = 8$

$(2x + 3y = 3) \div 2$

$-4x - 6y = -6$

$0 = 2$

no
solution

Perform the indicated operation.

19. $(2y^2 - 5y + 1) + (y^2 - y - 4)$

$3y^2 - 6y - 3$

20. $(6m^3 - 5) - (m^3 + 4m^2 - 9m - 2)$

$5m^3 - 4m^2 + 9m - 3$

Key

21. $(4t+1)^2$

$$(4t+1)(4t+1)$$

$$16t^2 + 8t + 1$$

22. $(n+5)(2n^2 - n - 7)$

$$2n^3 - n^2 - 7n + 10n^2 - 5n - 35$$

$$2n^3 + 9n^2 - 12n - 35$$

23. $2x^3(5x-1)$

$$10x^4 - 2x^3$$

Factor each polynomial.

24. $x^2 - 11x + 30$

$$(x-6)(x-5)$$

25. $4x^2 - 121$

$$(2x-11)(2x+11)$$

26. $2x^2 - 5x + 3$

$$(2x-3)(x-1)$$

27. $8x^3 + 343$

$$(2x+7)(4x^2-14x+49)$$

28. $3x^2 - 27$

$$3(x^2 - 9)$$

$$3(x-3)(x+3)$$

29. $(2x^3 - 9x^2)(-2x+9)$

$$x^2(2x-9) - 1(2x-9)$$

$$(x^2-1)(2x-9)$$

$$(x-1)(x+1)(2x-9)$$

30. $x^6 - 4$

$$(x^3-2)(x^3+2)$$

31. $d^4 - 7d^2 + 10$

$$(d^2-5)(d^2-2)$$

33. $24q^3 - 81$

$$3(8q^3 - 27)$$

$$3(2q-3)(4q^2+6q+9)$$

Simplify

34. $\left(\frac{3}{2}\right)^2$

$$3^{\frac{6}{2}} = 3^3 = 27$$

35. $\frac{4^{\frac{2}{3}}}{4^{\frac{1}{3}}}$

$$4^{\frac{1}{3}}$$

36. $\sqrt[3]{7} \cdot \sqrt[3]{49}$

$$\sqrt[3]{343} = 7$$

37. $\left(6^{\frac{2}{3}}\right)^{\frac{3}{4}}$

$$6^{\frac{1}{2}} = 6^{\frac{1}{2}}$$

38. $6\sqrt[3]{5} + 2\sqrt[3]{5}$

$$8\sqrt[3]{5}$$

39. $\sqrt[4]{3x^7y^9z^3}$

$$xy^2\sqrt[4]{3x^3yz^3}$$

40. $x^5 \cdot x^{\sqrt{3}}$

$$x^{5+\sqrt{3}}$$

38. $(\sqrt[3]{x^4} \cdot \sqrt{x})^{-2}$

$$\left(x^{\frac{4}{3}} \cdot x^{\frac{1}{2}}\right)^{-2}$$

$$\left(x^{\frac{8}{6}} \cdot x^{\frac{3}{6}}\right)^{-2}$$

$$\left(x^{\frac{11}{6}}\right)^{-2} = x^{-\frac{22}{6}} = \frac{1}{x^{\frac{22}{6}}} \cdot x^{\frac{22}{6}}$$

$$\frac{x^{\frac{1}{3}}}{x^4}$$

Key

Using the given functions, perform the indicated operations. State the domain.

$$f(x) = 3x + 2$$

$$g(x) = 2x^2$$

$$h(x) = \frac{-4}{x+3}$$

39. $f(x) + g(x)$

$$(3x+2) + (2x^2)$$

$$\boxed{2x^2 + 3x + 2} \quad \mathbb{R}$$

40. $h(x) - f(x)$

$$\frac{-4}{x+3} - (3x+2)$$

$$\frac{-4}{x+3} - 3x - 2$$

$$\boxed{\frac{-4}{x+3} - 3x - 2} \quad x \neq -3$$

41. $\frac{g(x)}{f(x)}$

$$\frac{2x^2}{3x+2}$$

$$x \neq -\frac{2}{3}$$

42. $h(x) \cdot g(x)$

$$\left(\frac{-4}{x+3}\right) 2x^2 = \frac{-8x^2}{x+3}$$

$$x \neq -3$$

43. $h(g(x))$

$$h(2x^2)$$

$$\frac{-4}{2x^2+3}$$

$$\mathbb{R}$$

44. $f(g(x))$

$$f(2x^2)$$

$$3(2x^2) + 2$$

$$\boxed{6x^2 + 2} \quad \mathbb{R}$$

State the domain and range

45. $f(x) = 2x - 5$

$$D: \mathbb{R}$$

$$R: \mathbb{R}$$

46. $f(x) = -x^2 + 5$

$$D: \mathbb{R}$$

$$R: y \leq 5$$

47. $f(x) = |x - 2| + 3$

$$D: \mathbb{R}$$

$$R: y \geq 3$$

48. $g(x) = \sqrt{x} + 2$

$$D: x \geq 0$$

$$R: y \geq 2$$

49. $h(x) = x^2 + 6x + 8$

$$D: \mathbb{R}$$

$$R: y \geq -1$$

50. $g(x) = -\sqrt{x-2}$

$$D: x \geq 2$$

$$R: y \leq 0$$

51. $f(x) = -|x| + 3$

$$D: \mathbb{R}$$

$$R: y \leq 3$$

52. $g(x) = x^3 - 4$

$$D: \mathbb{R}$$

$$R: \mathbb{R}$$

53. $g(x) = \sqrt{2x+4} - 3$

$$D: x \geq -2$$

$$R: y \geq -3$$

Find the inverse of the function.

54. $y = \frac{3}{5}x - \frac{2}{5}$

$$x = \frac{3}{5}y - \frac{2}{5}$$

$$\left[x + \frac{2}{5} = \frac{3}{5}y\right] \frac{5}{3}$$

$$\boxed{\frac{5}{3}x + \frac{2}{3} = y}$$

55. $y = \sqrt{x-2} + 4$

$$x = \sqrt{y-2} + 4$$

$$x - 4 = \sqrt{y-2}$$

$$(x-4)^2 = y-2$$

$$\boxed{y = (x-4)^2 + 2}$$

56. $y = x^2 + 2$

$$x = y^2 + 2$$

$$x - 2 = y^2$$

$$\boxed{y = \sqrt{x-2} \quad x \geq 2}$$

Key

Solve the quadratic equation

57. $9x^2 - 4 = 0$

$9x^2 = 4$

$x^2 = \frac{4}{9}$

$x = \pm \frac{2}{3}$

59. $\frac{1}{2}x^2 - 8 = 16$

$\frac{1}{2}x^2 = 24$

$x^2 = 48$

$x = \pm 4\sqrt{3}$

61. $x^2 + 6x + 10 = 0$

$x^2 + 6x + 9 = -10 + 9$

$(x+3)^2 = -1$

$(x+3) = \pm i$

$x = -3 \pm i$

63. $2(x-3)^2 = -2x+9$

$2(x^2 - 6x + 9) = -2x + 9$

$2x^2 - 12x + 18 = -2x + 9$

$2x^2 - 10x + 9 = 0$

$x = \frac{10 \pm \sqrt{(-10)^2 - 4(2)(9)}}{2(2)} = \frac{10 \pm \sqrt{28}}{4}$

$x = \frac{10 \pm 2\sqrt{7}}{4}$
 $x = \frac{5 \pm \sqrt{7}}{2}$

64. $10x^2 + x = 2$

$10x^2 + x - 2 = 0$

$(5x-2)(2x+1) = 0$

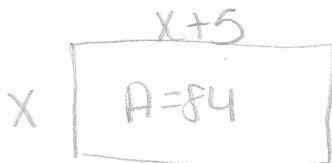
$5x-2=0$

$x = \frac{2}{5}$

$2x+1=0$

$x = -\frac{1}{2}$

65. The area of a rectangle is 84 square inches. The length is 5 more than the width. Find the dimensions of the rectangle.



$84 = x(x+5)$

$84 = x^2 + 5x$

$0 = x^2 + 5x - 84$

$0 = (x+12)(x-7)$

$x = -12$

$x = 7$

$(2x+3)(x-3)$

$x = -\frac{3}{2}$ or $x = 3$



58. $2x^2 - 3x - 9 = 0$ $a=2$ $b=-3$ $c=-9$

$x = \frac{3 \pm \sqrt{(-3)^2 - 4(2)(-9)}}{2(2)}$

$x = \frac{3 \pm \sqrt{81}}{4} = \frac{3 \pm 9}{4} = \frac{12}{4}$ or $-\frac{6}{4}$

60. $-2(x-1)^2 = 36$

$x = 3$ or $-\frac{3}{2}$

$(x-1)^2 = -18$

$x-1 = \pm 3\sqrt{2}$

$x = 1 \pm 3\sqrt{2}$

62. $2x^2 - 5x = 2$

$2x^2 - 5x - 2 = 0$

$x = \frac{5 \pm \sqrt{(-5)^2 - 4(2)(-2)}}{2(2)}$

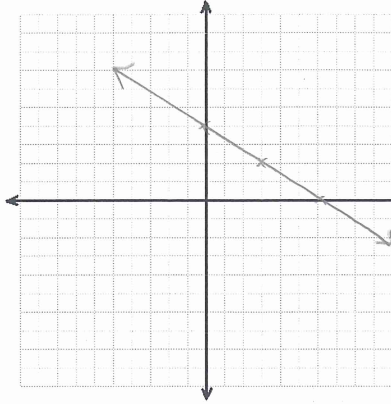
$x = \frac{5 \pm \sqrt{41}}{4}$

$a=2$
 $b=-5$
 $c=-2$

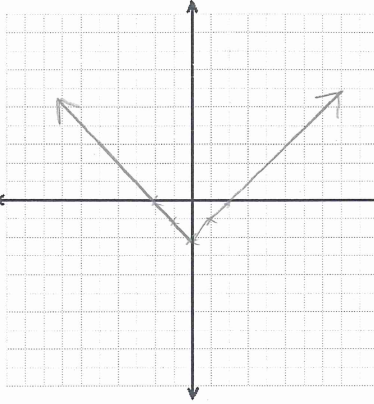
Key

Graph

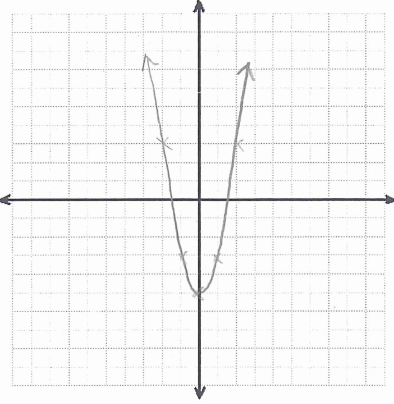
66. $y = -\frac{2}{3}x + 4$



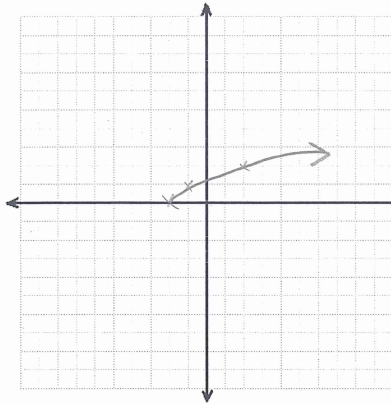
67. $y = |x| - 2$



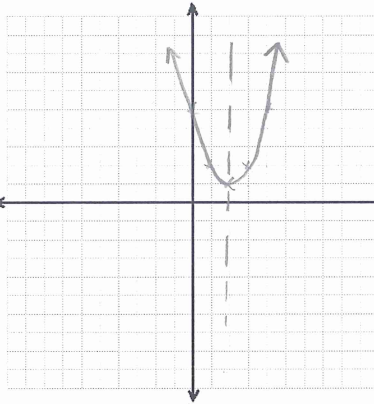
68. $y = 2x^2 - 5$



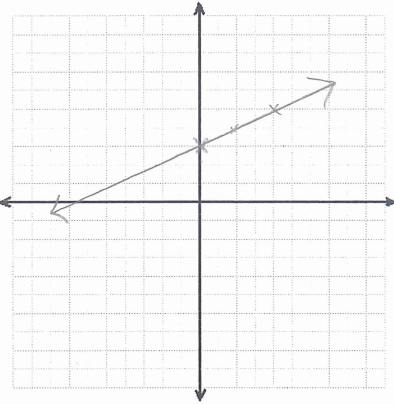
69. $y = \sqrt{x+2}$



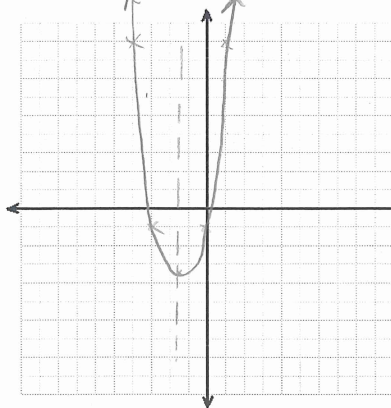
70. $y = (x-2)^2 + 1$



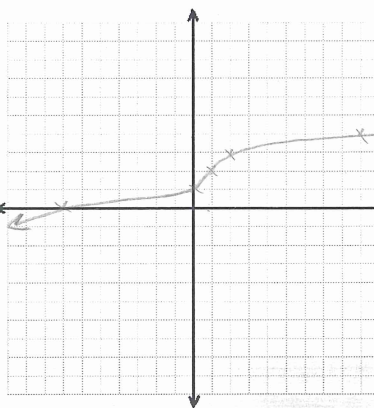
71. $y = \frac{x+6}{2} \rightarrow y = \frac{1}{2}x + 3$



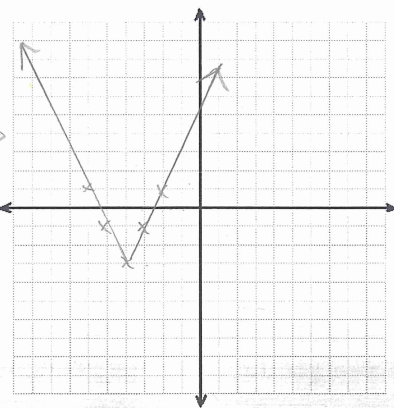
72. $y = 2x^2 + 6x + 1$



73. $y = \sqrt[3]{x-1} + 2$



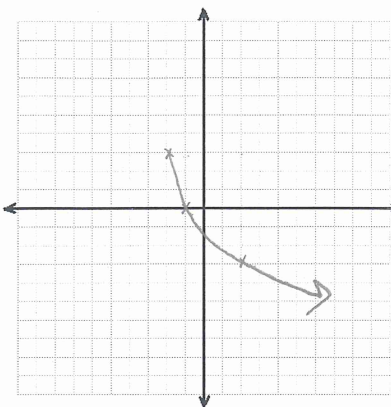
74. $y = 2|x+4| - 3$



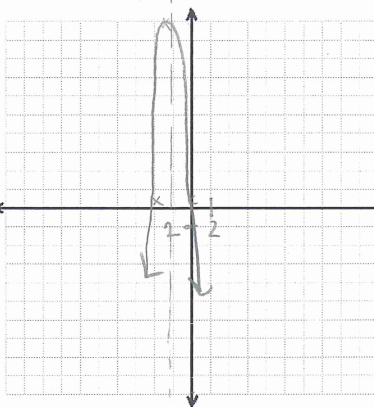
$x: \frac{-b}{2a} = \frac{-6}{2(2)} = \frac{-6}{4} = -\frac{3}{2}$
 vertex: $(-\frac{3}{2}, -\frac{7}{2})$
 $y: y = 2(-\frac{3}{2})^2 + 6(-\frac{3}{2}) + 1$
 $y = -\frac{7}{2}$

Key

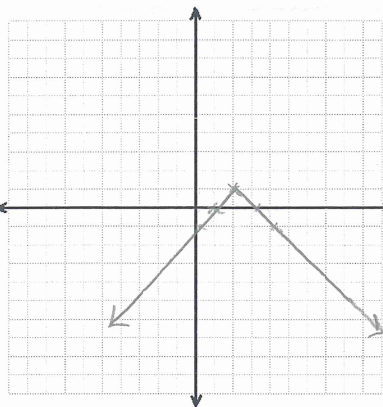
75. $y = -3\sqrt{x+2} + 3$



76. $y = x^2 + 5x + 1$



77. $y = -|x-2| + 1$



$x: \frac{-5}{2(1)} = -\frac{5}{2}$ $y: y = (-5/2)^2 + 5(-5/2) + 1$
 $y = 79/4$

Solve the quadratic inequality. Test the critical points

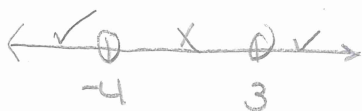
78. $x^2 + x - 12 > 0$

$(x+4)(x-3)$

$x+4=0$ $x-3=0$

$x=-4$ $x=3$

$(-\infty, -4) \cup (3, \infty)$



$x=0$ $x=-5$ $x=4$
 $(0)^2 + (0) - 12$ $(-5)^2 + (-5) - 12$ $(4)^2 + (4) - 12$
 $-12 \not> 0$ $8 > 0$ $8 > 0$

79. $x^2 - 3x - 18 \leq 0$

$(x-6)(x+3)$

$x-6=0$ $x+3=0$

$x=6$ $x=-3$

$[-3, 6]$



$x=0$ $x=-4$ $x=7$
 $(0)^2 - 3(0) - 18$ $(-4)^2 - 3(-4) - 18$ $(7)^2 - 3(7) - 18$
 $-18 \leq 0$ $10 \not\leq 0$ $10 \leq 0$

Get Ready for the Next Topic

- Chapter 8, Sections 2-6
- Skills needed
 - Factoring
 - Understanding/Knowing Transformation Rules
 - Identifying Domain and Range
 - Properties of Fractions
 - How to Add/Subtract
 - How to Multiply/Divide